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Evaluating the School Science Program

The school science program includes teaching staff and their ongoing professional development, school facilities and science materials, the science curriculum, activities and events both within and outside of the classroom, and assessment tools which are in use to judge the value and impact of science teaching and learning. An informal survey of district-level supervisors for science within RI during the course of the development of this framework, indicated that most districts within the state do not have a formal means of science program evaluation in place. This section will provide for all RI districts and schools an orientation to the purposes and possible format of science program evaluation

The RI state science framework, with its associated benchmarks for K-12 science teaching and learning, provides a common frame of reference for the design of local science curricula and a basis for ongoing evaluation of its design, implementation, and continued refinement. Evaluation of the school science program and implementation of the science benchmarks advocated here can proceed at three distinct but interrelated levels:

1) State assessments: The committee's development of this statewide science framework is coupled with the state's recognition of the need for a statewide assessment system which includes the sciences. This statewide assessment system will include a science component focused on performance-based assessment of science learning on the part of students. A sense of what these items might look like can be gained by studying the prototype state performance assessment items in science available from the Office of Outcomes and Assessment, RI Department of Elementary and Secondary Education.

2) System assessments: Each school district should develop a comprehensive approach to evaluating its science program with provision for input opportunities from a wide spectrum of the local community. This evaluation plan can build upon excellent instruments already developed and tested by the National Science Teachers Association (see Chapter 9 for contact information). The team which develops these instruments for district evaluation should have significant representation from those closest to the actual delivery of the curriculum -- the

teachers and instructional support staff. Local business leaders, especially those conversant with the development of quality indicators, can bring needed expertise to the development of appropriate and effective indicators of quality for the school science program.

3) Site assessments: Every school building and each classroom teacher of science should engage in an annual evaluation of the science program within their building/classroom. This would include attention to student perceptions of the science program, parent and administrator perceptions, analysis of student assessment information in light of possible program changes (including grade distributions disaggregated by race, gender, and special needs), and attention to the scope and sequence of the science curriculum within the building to ensure that it is developmentally appropriate, conceptually linked, and focused on science understandings that are crucial to general scientific literacy. It is critical also to involve guidance counselors, school psychologists, and specialists in special needs populations, LEP, and equity to ascertain to what degree the school science curriculum is addressing the needs of all students. One useful template for the development of such a site-based science program evaluation is the Elementary Science Program Evaluation Test II in use across New York State and available from the New York State Education Department Publications Sales Desk (518-474-3806).

To facilitate an evaluative judgment of the success of the science curriculum within each school system, data must be collected in a variety of forms, and whenever possible, at all three levels indicated above. These data can also be thought of as falling into three distinct categories of data:

Type 1: Quantifiable data: Factual data such as enrollment figures in science courses, written policies, records of classroom visits, test results, etc.

Type 2: Qualitative data: Data to which a professional or personal judgment could be applied such as student portfolios of exemplary work, displays of children's work, resource materials developed by teachers for the curriculum, observations of classroom learning situations, etc.

Type 3: Inferred data: Data based on impressions of professionals regarding such items as student involvement in science projects, environmental problems in the community and student engagement in such problems, "science fair" participation, science Olympiads, contests, etc. Teacher participation in workshops, science conventions, professional organizations, etc. can also be included in this type of data.

The following table illustrates a suggested basis for evaluating the school science curriculum with reference to the RI state science going evaluation comprised of samples like these should occur through all phases of development, implementation, and refinement.

PHASE	STANDARD	QUANTIFIABLE INSTRUMENT	QUALITATIVE INSTRUMENT	INFERRED INSTRUMENT
Implementation	All students (K-12) are provided opportunities to attain all of the state science benchmarks.	Records of student enrollment and adequate certified teaching staff	Science programs are engaging all students	Students scientific literacy is increasing
Implementation	Students are engaged in opportunities to attain the benchmarks in the RI State Science Framework	Progress reports at appropriate grade levels of student achievement on evaluative instruments	Science instruction provides opportunities for student achievement as evidenced by student portfolios	Student's know more about science and connect it to everyday life and events
Ongoing	Staff development opportunities are available and funding sources are being actively sought	Records of workshops, course reimbursements or incentives are available to teaching staff	Teachers and staff are involved in workshops as active participants	Enthusiasm of professional staff as indicated by organization memberships, teaching awards, grant proposals, etc.
Ongoing	Curriculum revision opportunities are scheduled and supported	Records of periodic meetings of curriculum teams and records of document revision	Teacher feedback of progress and needs	Instructional staff aware of ongoing curriculum efforts and its relation to current curriculum

"Children are the living messages we send to a time we will not see."

Neil Postman from The Disappearance of Childhood, 1982.

Good science programs are characterized by many common features. Exemplary science programs from across the United States have been featured in a series of monographs published by the National Science Teachers Association. Project PRISM, a program of the National Urban League, Inc. in association with the National Council of La Raza, the NETWORK, Inc., and Thirteen/WNET, funded by the Annenberg/CPB Math and Science Project, have identified ten things to look for in science programs:

1. Science is "hands-on" and "minds-on."

2. Students are encouraged and taught to ask questions about nature.

3. Students learn how to find out.

4. Students practice skills in order to become good at them.

5. Students learn to think for themselves and recognize false claims.

6. Students work in groups.

7. Teachers use different ways to find out what their students have learned.

8. Students study science every day.

9. Teachers expect all students to succeed and set high goals for themselves.

10. Teachers have opportunities to improve their science teaching skills.

References and Further Reading:

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